

On Books

New Paradigm for Behavior Analysis: A Review of *Behavior and Mind* by Howard Rachlin

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This is a groundbreaking book. It is Rachlin's first full presentation of a new paradigm for behavior analysis. Although the name he gives to his view, *teleological behaviorism*, and his use of Aristotle's notion of final causes may to some conjure up the specter of causes in the future, this misapprehension vanishes when we come to appreciate these radical ideas, which have little to do with conventional notions about past and future. Because he could have used a less off-putting name, like *molar behaviorism* (my suggestion; Baum, 1989), and it remains to be seen what it will be called, in this review I shall call it simply *the view*.

The view not only may be found expressed in Rachlin's (1985, 1992) earlier writings but also grows directly out of traditional—if a line only 50 or 60 years old may be called so—behavior analysis. It owes much to Skinner and to Ryle and to Herrnstein. In a real sense, Rachlin is taking radical behaviorism toward its logical conclusions.

In the 19th century, when psychology was first establishing itself as a science, the founders—figures such as Wundt, J. S. Mill, Titchener, and Ebbinghaus—relied for explanation and understanding of mental phenomena on discrete, atomistic units such as

ideas, sensations, stimuli, and responses. They were probably thinking along the same lines as physicists, for whom a common model was corpuscular mechanics. Matter was thought to occur in small discrete bits—corpuscles—that interacted with one another by collision. One thinks of billiard balls. Similarly, 19th century connectionists thought their discrete units interacted by contact—in time rather than in space—with the result that the chief explanatory principle became contiguity. If two events were repeatedly contiguous, an association would form between them. Applied to behavior, this model became reflexology and stimulus–response (S-R) psychology.

Connectionism was a good start in that it supplied a more concrete way of thinking about mental phenomena and behavior than had existed before, but its shortcomings began to be apparent by the turn of the century. It was too implausible to think that behavior, particularly human behavior, was reflexively driven by whatever stimuli happened to be present at the moment.

Thorndike's statement of the law of effect represented a step away from simple connectionism. Even though it was couched entirely in terms of contiguity (stimulus contiguous with response and response contiguous with consequence), the effects of his satisfiers and annoyers introduced a new, albeit subtle, change in the role of time, because consequences act backwards in time to strengthen what produced them. The concept of strength-

Rachlin, H. (1994). *Behavior and mind*. New York: Oxford University Press. 163 pp.

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ening by consequences implied spans of time during which the strengthening might occur, a notion we are familiar with today in Skinner's idea of history of reinforcement.

Skinner broke with the connectionist model in two radical ways, embodied in his two inventions, the concepts of operant behavior and stimulus control. When I am hunting for my mislaid keys, it is hard to see any stimulus causing each momentary act of hunting, but it is easy to see the setting (absence of keys) and the function of the activity (locating the keys). The idea of defining behavior, not in terms of muscle movements or appearance (i.e., structure) but in terms of function, opened the door to selectionist explanations of behavior that parallel those of evolutionary theory.

A functional category of behavior (e.g., an operant) is analogous to a population of organisms. Whereas in the S-R view there was no role for variation in the response, selectionist explanations assign a central role to variation. Evolutionary change results from differential success among variants in the population and consists of change in the frequencies of different variants in the population over time. As a result, selectionist explanations rely on history and patterns—patterns of variation within the population that change through time in response to patterns of variation in success. As the pattern within a population of organisms cannot be assessed at a point in space but only over a geographical area (habitat), so the pattern within a behavioral population (functional category) cannot be assessed at a point in time but only over an extended sample, such as an hour, day, or month. Measuring a response rate, for example, takes some time. The result is that interest moves from momentary events to extended patterns of events.

The idea of stimulus control served to strengthen this move. Instead of assigning to stimulus the role of momentary cause, it assigned a role analogous to habitat in evolutionary biology. In a

given habitat, a certain pattern of differential reproductive success prevails; in a given setting, a certain pattern of differential reinforcement prevails. Compared with the notion of stimulus in reflexology, the setting (discriminative stimulus) has a relation to the pattern of behavior that is at least looser than a momentary cause, if it is thought of as a cause at all. The setting might be said to modulate the extended pattern of behavior in its presence.

Although Skinner's use of response frequency as datum and his equation of stimulus to context moved behavior analysis away from a science based on momentary events, his notion of consequences remained Thorndike's relation of contiguity. There is no compelling reason, theoretical or empirical, why reinforcement and punishment should be thought of as contiguity between a momentary response and a momentary consequence; indeed, the idea that behavior is organized into extended patterns encourages a view of consequences as similarly extended patterns. A rate of responding produces a rate of reinforcement, and different rates of responding may produce different rates of reinforcement, thereby leading to changes in the population of response rates. Different patterns of frequencies among activities may produce different patterns of frequencies among consequences, and some mixes of consequences may be more satisfactory than others. This is the direction in which Rachlin strives to move behavior analysis—beyond the limitations of Thorndike's and Skinner's emphasis on behavior-reinforcer contiguity.

Although one may find some of the ideas in his earlier works (e.g., Rachlin, 1985, 1992), in this book, he presents most fully his arguments that, not only is behavior best seen as extended patterns, but that the alternative of viewing it as discrete, momentary events is impossible. He begins with Skinner's notion that all behavioral units are categorical (i.e., generic), and then proceeds to add: (a) The catego-

rising of behavior requires extended patterns because (b) it cannot be accomplished at moments of time.

Suppose you see someone sitting with an open book in good light and gazing in the direction of the pages. How do you judge whether he is reading or daydreaming? A momentary snapshot cannot suffice. You will have to watch for a while, see if he turns the pages, and see if he behaves afterwards in accordance with the material in the text (e.g., can summarize or answer questions). Only from such extended patterns can you categorize the activity confidently. The point applies not only to judgments of others' behavior, but also to one's own. Many times I "read" a page, only to discover after that I have no idea what was there and that I really was thinking of something else. It applies even to the simpler preparations of the laboratory. How do you judge whether if a rat is in the act of pressing a lever? A snapshot of a rat in front of a lever cannot tell. Indeed, to distinguish between exploratory activity and operant lever pressing, we need to show that the rate of pressing exceeds the operant level—a judgment that requires extended observation.

Rachlin (1985) applied the view to pain, considered by philosophers to be the quintessential private event. In that discussion, Rachlin took Ryle's (1949) argument that mental terms serve logically only to label categories of behavior, and applied it to private events such as pain. How do you decide, Rachlin asked, whether someone is in pain or only faking? If he groans and grimaces and limps at one time, but 10 minutes later is smiling and walking normally, should we conclude he was faking or that he made a rapid recovery? Only by observing the pattern of behavior over an extended period are we able to make such a judgment. In this book, Rachlin applies this point to sensation in general and argues that this was also Aristotle's treatment of sensation. How do you tell if someone sees a stop sign? If he stops his car at an intersection, it could be an instance

of some other activity, such as stopping to consult a map or to look around. Only by observing the full pattern of stopping and going and comparing it with other instances of stopping and going can you categorize the instance with confidence as "seeing the stop sign." Rachlin suggests that such emphasis on categorization became central to Aristotle's thinking because he was called upon to categorize all the specimens collected and sent to him by Alexander the Great. Whatever the case, he was sensitized to the problem of creating categories that are useful and dealing with ambiguous instances.

When applied to behavior, Rachlin points out, Aristotle's treatment of sensation parallels the behavior-analytic concept of discrimination: The only way one can tell whether a pigeon discriminates between red and green is that behavior differs from color to color. Seeing is discriminating.

Rachlin's two chapters on Aristotle were a difficult read for me, and his reconstruction of Plato as a behaviorist in chapter 3 was tough. Whether Plato and Aristotle were behaviorists or not—and Rachlin admits that this is much more widely believed of Aristotle than Plato—he convinced me of two points. First, behavioristic thinking may have begun at the very dawn of Western philosophy. That would mean that the debate between behaviorism and mentalism goes back to the very beginning of thought about behavior. Second, attempts to explain behavior as momentary events driven by prior causes, if they are possible at all, will be forever incomplete without an analysis in terms of temporally extended patterns.

To clarify the incompleteness of momentary events, Rachlin makes use of Aristotle's distinction between efficient causes and final causes. Efficient causes are the ones people today are most likely to think of when they hear the word cause: prior events, usually immediate, that, because of the way the universe is constructed, produce the ef-

fect observed. If A is an efficient cause of B, then A is an event such that its occurrence necessitates B as the next event.

A final cause is a larger pattern into which events fit and relate to one another, as (Rachlin's example) the notes of a symphony fit together to make the symphony. Each note is explained by its fitting into the symphony. Without it, the symphony would be incomplete or a different symphony. Thus one may say that the note occurs because it is part of or fits into the symphony. The example of the symphony is a good one because a symphony extends through time. Until the performance is over, one cannot say it is Beethoven's Fifth; it might only be the first notes or the first movement. If A is the final cause of B, B is explained as a part that fits into A as a whole.

During the 18th and 19th centuries, scientific thought narrowed to viewing the universe as a perfectly predictable machine, like a pocket watch or steam engine. Laplace (1749–1827), perhaps in his enthusiasm over Copernicus, Galileo, or Newton, asserted that if the position and motion of every particle in the universe were known at one moment, it would be possible to predict exactly the state of the universe in the next moment. By this he meant that particles in motion would continue to move at the same velocity in the same direction and that those in collision would affect one another in ways that could be described by simple laws of physics. In a watch or an engine, one part transfers motion to another by pushing at a certain point. A view of the universe that confines itself to discrete objects and events that affect one another at points in space and moments of time I shall call *mechanical*.

The result of the 19th century's insistence on a mechanical model of the universe is that today the word *cause* has become synonymous with *efficient cause*. So strong is the tendency to see causes as prior events only, that final causes are often misunderstood as efficient causes that lie in the future and

are dismissed as impossible. The misunderstanding is compounded if a system is said to "move toward" a final state or goal, because these words may suggest events in the future, even though they may also be thought of as extended patterns that develop or clarify in time. This misunderstanding has given the word teleology (the Greek root *telos* means end or result, but with the connotation of perfecting or completing) a bad name, as if a concern with ends meant necessarily some spooky idea of future efficient causes. Instead, final causes constitute a different type of cause altogether and a different notion of time altogether, in which past, present, and future either take on altered roles or disappear.

Subsequent developments in physics proved Laplace wrong, with the result that corpuscular mechanics gave way in the 20th century to notions like field, wave, and flow, in which time and space assume different roles from the ones usually thought of in Western culture, in which they are relative and interrelated and more akin to final than efficient causes. In my view, Rachlin is trying to make a similar shift in behavior analysis, away from a contiguity-based view—a sort of behavioral mechanics—that is at least incomplete, if not simply wrong, and toward the equivalent of relativity theory (behavioral relativity?). For example, when we explain a rat's lever pressing as the outcome of training with food reinforcement, we are appealing to a pattern of events—chamber, lever, contingency, deprivation—all of which together eventually include lever pressing as part of the pattern. Lever pressing fits into this pattern, which might just as well be called *feeding*, as a piece fits into a puzzle or notes into a symphony. Without it, the pattern would remain incomplete. This is the nature of explanations that appeal to history of reinforcement. Rachlin seeks to complete the line that Skinner began.

Rachlin is at his strongest when he writes on his own behalf. Although the

chapters on Plato and Aristotle and the one on Augustine and Descartes greatly strengthen his case, I found the first two chapters and the last chapter to be the best. The first chapter contains a historical overview and begins to define the view that Rachlin calls *teleological behaviorism*. He distinguishes it from mentalism, physiologism, cognitivism, and Skinnerian behaviorism, setting the stage for applying the view not only to public behavior but also to mental terms.

Perhaps the most intriguing aspect of Rachlin's approach is that he proposes to treat mental terms as extended patterns of public behavior. As with visual sensation, perception, or pain, he argues in general that to love, hope, expect, believe, or intend means to exhibit enough of a pattern to induce such a judgment in an observer (someone else or oneself). Some such judgments take longer to make than others because the patterns involved are more extended in time. It takes less time to eat a meal than to expect a meal. It takes less time to enjoy a success than to hope for it. There is no other difference, however, between eating and expecting to eat or between enjoying and hoping. All are categorical judgments based on time samples that are necessarily extended in time. How, Rachlin would ask, do you know Tom is eating a meal or only having an appetizer, if he expects a meal or is hanging around because he likes our company, if Liz enjoys her success or takes it for granted, if she hopes to succeed or fears that she will fail? All of these are the same sorts of judgments, based on extended

observation of the person's public behavior (including verbal), but some we think are subtler than others. To Rachlin, subtler just means longer.

Such conclusions should command the attention of behavior analysts, because they hold out the possibility of a more satisfactory way to deal with both mental terms and private events. Rejecting mental terms while having no account of them renders behavior analysis in the eyes of most English speakers implausible or incomplete. How acceptable is a science of behavior that cannot explain what it means to hope for or expect an event? Skinner's insistence that private events are just like public events similarly flies in the face of normal English speech habits. How sustainable is the claim that private events inferred have the same status as public events observed? If you have wondered how to avoid mentalism without being doctrinaire, if you have wondered how to avoid overly mechanistic interpretations of behavior, or if you have wondered how behavior analysis might further develop the line of thinking started by Skinner, this is an important book to read. Your efforts will be well repaid.

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